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Fusion installations — Criteria for the design and operation of confinement and ventilation systems of tritium fusion facilities and fusion fuel handling facilities

Installations de fusion — Critères pour la conception et l'exploitation des systèmes de confinement et de ventilation des installations de fusion avec tritium et des installations de traitement des combustibles de fusion

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 85, *Nuclear energy*, Subcommittee SC 2, *Radiological protection*.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html

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Introduction

Confinement and ventilation systems implemented in fusion facilities using radioactive materials and fusion fuel handling facilities ensure a safety function aiming at protecting the workers, the public and the environment from the dissemination of radioactive contamination, including but not limited to tritium, likely to be released from the operation of these installations.

This document applies specifically to confinement and ventilation systems for tritium fusion facilities and fusion fuel handling facilities and their specific buildings (such as fuel handling facilities, hot cells, examination laboratories, emergency management centres, radioactive waste treatment and storage station).

In such fusion installations, tritium is particularly focused, as their tritium inventory may be high and as it is likely to have a broader impact on workers, the environment or the members of the public than the other radionuclides.

In most countries, a tritium quantity is declared as high for tritium inventories in a facility site higher than a range of 10 g to 100 g. In the tritium fusion facilities in the scope of this document, the tritium inventory is deemed to be much higher than this range for the whole facility site.

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Fusion installations — Criteria for the design and operation of confinement and ventilation systems of tritium fusion facilities and fusion fuel handling facilities

1 Scope

This document specifies the applicable requirements related to the design and the operation of confinement and ventilation systems for fusion facilities for tritium fuels and tritium fuel handling facilities specific for fusion applications for peaceful purposes using high tritium inventories, as well as for their specialized buildings such as hot cells, examination laboratories, emergency management centres, radioactive waste treatment and storage facilities.

In most countries, a tritium quantity is declared as high for tritium inventories higher than a range of 10 g to 100 g. In the tritium fusion facilities in the scope of this document, the tritium inventory is deemed to be higher than this range for the whole site.

This document applies especially to confinement and ventilation systems that ensure the safety function of nuclear facilities involved in nuclear fusion with the goal to protect the workers, the public and the environment from the dissemination of radioactive contamination originating from the operation of these installations, and in particular from airborne tritium contamination with adequate confinement systems.

The types of confinement systems for other facilities are covered by ISO 26802 for fission nuclear reactors, by ISO 17873 for facilities other than fission nuclear reactors and by ISO 16647 for nuclear worksite and for nuclear installations under decommissioning. The facilities covered by these three standards, notably ISO 17873, include tritium as a radioactive material among the ones to be confined, but tritium is not their driver of the risks for workers and for members of the public. Nevertheless, the tritium quantities and risks from fusion facilities create specificities for a specific standard (e.g. in fusion facilities, tritium is the driver of routine and accident consequences). Therefore, the scope of this document does not cover the other facilities involved in tritium releases (ISO 17873, ISO 16647 and ISO 26802), even though these other facilities create tritium releases (e.g. non-reactor fission facilities, tritium laboratories, tritium removal facilities from fission plants, tritium defence facilities).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 10648-2, *Containment enclosures — Part 2: Classification according to leak tightness and associated checking methods*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

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